ARJUNA JEE 2023

Atomic Structure

DPP-07

1. If wavelength is equal to the distance travelled by the electron in one second, then:

(1) $\lambda = \frac{h}{p}$ (2) $\lambda = \frac{h}{m}$

(3) $\lambda = \sqrt{\frac{h}{p}}$ (4) $\lambda = \sqrt{\frac{h}{m}}$

2. The de Broglie wavelength of a tennis ball of mass 60 g moving with a velocity of 10m/s approximately: (Planck's constant, $h = 6.63 \times 10^{-34}$ Js)

(1) 10^{-33} m (2) 10^{-31} m

(3) 10^{-16} m (4) 10^{-25} m

3. Which of the following has least de Broglie λ

(1) e^- (2) p

(3) CO_2 (4) SO_2

4. In H-atom, if 'x' is the radius of the first Bohr orbit, de Broglie wavelength of an electron in 3rd orbit is

(1) $3\pi x$ (2) $6\pi x$

(3) $\frac{9x}{2}$ (4) $\frac{x}{2}$

5. If the uncertainty in position of a moving particle is 0 then find out ΔP

(1) 0 (2) 1

(3) Infinite (4) None of these

6. Calculate the uncertainty in velocity of a cricket ball of mass 150 g if the uncertainty in its position is of the order of 1 Å ($h = 6.6 \times 10^{-34}$ Kg m^2s^{-1})

(1) $3.499 \times 10^{-24} ms^{-1}$

(2) $3.499 \times 10^{-21} ms^{-1}$

(3) $3.499 \times 10^{-20} ms^{-1}$

(4) $3.499 \times 10^{21} ms^{-1}$

7. Uncertainty in measuring the speed of a particle is numerically equal to the uncertainty in measuring its position. The value of these uncertainties will be

(1) Equal to $\sqrt{\frac{h}{4\pi m}}$

(2) Less than $\sqrt{\frac{h}{4\pi m}}$

(3) Greater than $\sqrt{\frac{h}{4\pi m}}$

(4) Both (1) or (3)

8. Which of the following is the most correct expression for Heisenberg's uncertainty principle?

(1) $\Delta x.\Delta p = \frac{h}{4\pi}$

(2) $\Delta x.\Delta p \geq \frac{h}{4\pi}$

(3) $\Delta x.\Delta p \leq \frac{h}{4\pi}$

(4) $\Delta x.\Delta v = \frac{h}{4\pi}$

9. The Heisenberg's uncertainty principle can be applied to

(1) A cricket ball

(2) A foot ball

(3) A jet aeroplane

(4) An electron

10. The uncertainty in the positions of an electron and proton is equal, the ratio of the uncertainties in the velocity of an electron and proton is

(1) 10^3: 1 (2) 1 : 1838

(3) 3672:1 (4) 1838:1

Answer Key

1. **(4)**
2. **(1)**
3. **(4)**
4. **(2)**
5. **(3)**
6. **(1)**
7. **(4)**
8. **(2)**
9. **(4)**
10. **(4)**

